

EFFECT OF OWNERSHIP DIVERSITY ON FINANCIAL DISTRESS: EVIDENCE FROM COLOMBO STOCK EXCHANGE

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Abstract

Ownership diversity is defined as the distribution of ownership and control among various categories of shareholders. Many organizations' ownership structures have become increasingly diversified in terms of race, nationality, gender, and socioeconomic level in recent years. Globally, there's little consensus on how ownership diversity affects financial distress. Using the agency theory and entrenchment hypothesis, this study investigates how the diversity of ownership affects the financial distress of business firms. This research makes a contribution to the empirical literature by applying panel data analysis on 181 non-financial companies from 2012 to 2019 on the Colombo Stock Exchange of Sri Lanka. The study uses Herfindahl-Hirschman Index to measure ownership diversity. In contrast, Altman Z Score Analysis, Emerging Market Score, and Interest Coverage Ratio measure financial distress. The results of the logistic regression models demonstrate that ownership diversity significantly and positively affects financial distress. This signifies that the diversified ownership structure raises the agency cost as it incurs high monitoring costs to monitor diverse shareholders, leading to financial distress within business firms.

Keywords: Colombo Stock Exchange; Herfindahl-Hirschman Index; Financial Distress; Ownership Diversity

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1. Introduction

The spread of ownership and control among several distinct categories of shareholders is referred to as ownership diversity. (Roberson, Ryan, & Ragins, 2017; Harrison & Klein, 2007; Mayo, Kakarika, Mainemelis, & Deuschel, 2017). Diversified corporate ownership arrangements increase credibility and reduce knowledge asymmetry, providing strategic protection against financial distress. (Tarighi, Appolloni, Shirzad, & Azad, 2022). La Porta et al. (2000) assert that all parties involved in the capital market are particularly interested in and concerned about the impact of ownership diversity on financial distress. Non-diversified ownership causes agency cost and knowledge asymmetries (Lajili & Zeghal, 2010). When the non-diversified ownership structure percentage exceeds limits, major shareholders often use their control rights to extract the interests of little shareholders (Shleifer & Vishny, 1997).

When there is a concentrated ownership structure in a business organization, major shareholders aggressively lower their financial distress to avoid significant loss (Shleifer & Vishny, 1986). In this case, the major shareholders strive to optimize the firm's value by decreasing information asymmetries, agency issues, and resolving financial difficulties (Claessens et al., 2002). Non-diversified ownership creates information inequalities between significant and minor shareholders (Jensen, 1993). Because of knowledge gaps between significant and insignificant shareholders, significant shareholders want to maximize profits while neglecting insignificant shareholder interests (La Porta et al., 2000). Tarighi et al. (2022) found that diversified institutional shareholders play a critical influence on a company's ability to emerge from financial distress. Ali et al. (2021) reveal that a diversified ownership structure reduces financial distress. Uduwalage (2021) revealed that there is less likelihood of financial distress explained by the non-institutional ownership concentration.

According to the reviewed literature, ownership structures have a significant effect on financial distress in businesses. Despite several studies that examined this relationship, there is a dearth to find studies investigating the effect of ownership diversity, as assessed by a standard diversity index on financial distress by providing empirical support for the existing theories. Most Sri Lankan researchers focus on ownership concentration's impact on financial performance. (Manawaduge & De Zoysa, 2013; Pathirawasam & Wickremasinghe, 2012). Consequently, this research study attempts to bridge this persistent research gap by investigating the Sri Lankan companies' ownership diversity effect on financial distress using

the Herfindahl-Hirschman Index (HHI). Therefore, this study sought to assess, "*What is the effect of the ownership diversity on the financial distress in listed companies of the CSE?*"

The following is the organizational scheme for the remaining parts of the paper. The subsequent section of the paper reviews the existing literature and explained the hypothesis of the study. Following the discussion of the study's methodology part, the key conclusions are discussed. The final section of the study contains the conclusion.

2. Literature Review

This section reviews the existing literature to identify the related theories, develop a hypothesis, and identify the gap in the literature.

2.1. Theories

This section explains the theories related to the ownership of business firms and financial distress.

2.1.1. Agency Theory

Agency theory is used to determine how ownership structure affects a company's financial problems. (Berle & Means, 1932; Eisenhardt, 1989; Jensen & Meckling, 1976). The agency theory was drawn up on the basis that the shareholders (principals) and managers (agents) of modern businesses are segregated from ownership and control (Jensen & Meckling, 1976). Separation of ownership and management creates agency costs for resolving conflicts between principals and agents due to various interests (Eisenhardt, 1989).

Numerous scholars contend that higher ownership concentration raises agency costs inside business firms, hence causing financial distress (Mangena & Chamisa, 2008; Donker et al., 2009; Elloumi & Gueyie, 2001; Mangena & Chamisa, 2008). A higher ownership concentration structure of firms will increase agency conflicts between major and minor shareholders (Pound, 1999). When there is a concentrated ownership structure within the firm, the major shareholders can benefit by withholding paying dividends or moving profits to other companies under their control (Liu & Sun, 2010). The agency theory states that diversifying ownership reduces the controlling power of the major shareholders and brings down the conflict among major and minor shareholders within the business firm (reduces agency cost). This will lower the likelihood of financial distress.

2.1.2. Stewardship Theory

Stewardship theory states that stewards of the firms want to do an excellent job for the owners (principals) by maximizing their wealth and want to be good managers of the firm's properties (Subramanian, 2018). Stewardship theory says management and ownership structure are closely linked (Davis et al., 1997). This theory assumes that a firm can increase its performance by maintaining a good relationship between principals and stewards (Tosi et al., 2003; Eddleston & Kellermanns, 2007). When there is a concentrated ownership structure, significant shareholders have more controlling power. These concentrated owners will use that power to achieve their private benefits by influencing the firm's management. When major shareholders in the concentrated ownership structure try to control the management for their benefit, stewards become demotivated to maximize shareholders' wealth. They will create financial distress situation within the organization (Davis et al., 1997). According to the stewardship theory, when ownership is diversified, shareholders will not have considerable control power to seek their own gain. This will aid in the development of a positive relationship between stewards and principals within the company, and both parties will work in the same direction to maximize the shareholder's wealth.

2.1.3 The Entrenchment Theory

The entrenchment theory implies that when managerial ownership (insider ownership) gains more shares within the firm, its managerial employees get more power and create agency problems (Morck et al., 1988). McConnell and Servaes (1995) and McConnell and Servaes (1990) further investigate that a considerable shareholding of the organization's managerial level employees creates a management entrenchment and leads to create agency conflicts within the organization.

According to the entrenchment theory, when a particular firm's shares are concentrated with insider owners (managers), some managers' anti-takeover behavior activities occur within the organization and it will reduce the financial performance of the business firms and lead to a financial distress situation (Demsetz, 1983). The idea of this theory proposed that diversifying ownership reduces management entrenchment and lowers agency costs within the corporate enterprise. This will lessen the likelihood of financial distress.

2.2. Ownership Diversity

The dispersion of ownership and control among several varied types of shareholders is known as ownership diversity (Roberson et al., 2017; Harrison & Klein, 2007; Mayo et al.,

2017). Many finance researchers used diversity concepts to investigate business firms' social diversity among other financial variables (Jackson et al., 2003). In the finance literature, some commonly used measures to capture diversity (Roberson et al., 2007). Many scholars used Blau's Index and HHI as common diversity indices to assess the social diversity of business firms (Williams & O'Reilly, 1998; Harrison & Klein, 2007).

2.3. Financial Distress

Financial distress arises when a company's operating cash flows fall short of its short-term obligations (Akinsola, 2017). According to Gilson (1989), financial distress is a business failure due to the inability to pay maturing debts. According to Andrade and Kaplan (1997), there are two types of financial distress. The first is when the business firm fails to meet its current obligations. In contrast, the second one occurs when the business firms restructure their debt capital to prevent financial distress. Andrade and Kaplan (1997) further stated that when a business firm suffers from financial distress, it faces a cash shortage or a debt hang in liabilities.

2.4. Ownership Structure and Financial Distress

This section reviews the previous empirical findings related to the effect of the ownership structure on financial distress carried out by many finance researchers throughout the world. Jensen (1993) argues from the study carried out in the European context that when the ownership is not diversified within the organization, it causes information asymmetries among large shareholders and small shareholders. Large stockholders try to have their gains by disregarding the interests of small shareholders due to information asymmetry (La Porta et al., 2000). Accordingly, minor shareholders suffer due to the expropriation of their wealth, which will create a financial distress situation (Paker et al., 2002; Lee & Yeh, 2004; Doker et al., 2009). Lajili & Zeghal (2010) observed that a non-diversified ownership structure produces knowledge asymmetries between disperse shareholders and the major shareholder group. Major shareholders frequently expropriate the interests of minority shareholders to further their own interests when the percentage of ownership concentration exceeds certain criteria (Shleifer & Vishny, 1997).

In a sample of 144 healthy companies and 33 companies in financial hardship that were both listed on the Amsterdam Stock Exchange, Donker et al. (2009) looked at the impact of ownership concentration on financial distress. According to their findings, a business entity's chances of experiencing financial distress are lowered when it has significant external

stockholders. Hu and Zheng (2015) evaluated this impact using a sample of 378 Chinese-listed businesses that fail between 2000 and 2008. The findings demonstrate a negative correlation between ownership concentration and the likelihood of a financial crisis in Chinese listed firms. Deng and Wang (2006) discovered that non-diversified ownership structures have a greater likelihood of financial distress using a model of logistic regression on a sample of 194 Chinese listed companies. An empirical study was carried out by Jostarndt and Sautner (2008) to ascertain the impact of a non-diversified ownership structure on financial distress among German publicly traded enterprises. According to the study, ownership concentration causes financial distress. According to Poletti and Ozkan (2014), a strongly family-concentrated ownership structure is more likely to experience financial difficulties. This conclusion was reached by studying a sample of 484 United Kingdom-listed companies.

Most research currently conducted on ownership and financial distress in Sri Lanka concentrates on how ownership structure affects financial performance (Sameera & Samanthi, 2015). Pathirawasam and Wickramasingha (2012) investigated the impact of Sri Lanka's 102 CSE-listed businesses' performance on their concentrated ownership structure. This investigation revealed a relationship between the ownership concentration structure and business performance. Manawaduge and Zoysa (2013) found that a company's performance is not significantly impacted by the concentration of ownership using a sample of 157 non-financial companies listed on the CSE between 2000 and 2008.

Despite the fact that a large number of research studies examine the impact of ownership structure on financial distress, there is a dearth of studies that investigate the relationship between ownership diversity and financial distress in the Sri Lankan context and provide empirical support for existing theories. Therefore, the study proposed the following hypothesis by considering related theories and previous findings related to the effect of ownership structure on financial distress to find out the effect of ownership diversity on financial distress

H₀: Firms with diversified ownership structure have no positive effect on financial distress.

H₁: Firms with diversified ownership structure have a positive effect on financial distress.

3. Methods

This section discusses the methods used to determine the effect of ownership diversity on the financial distress of CSE-listed firms.

3.1. Sample Selection

The research study uses the stratified sampling technique to select the appropriate sample for this study. As of 30th June 2022, the CSE had 295 companies from 20 GICS sector groupings, with a market capitalization of Rs. 3,184.16 billion. Accordingly, the sample of this study includes all the industrial sectors of the CSE under the GICS classification, excluding the pharmaceuticals and biotechnology, life sciences sector, and technology hardware and equipment sector due to the absence of the data. Apart from the sectors mentioned above, the study also excluded the finance sector, including banks, diversified financials, and insurance companies from the sample due to the differences in the financial reporting practices (Shahwan, 2015). The financial industry has differences in regulations and corporate governance requirements compared to the non-financial sector (Lim et al., 2014). This study used 186 non-financial CSE-listed firms between 2012 and 2019. This study's final sample includes 65 percent of Sri Lankan stock exchange-listed companies and 1,488 firm-year observations.

3.2. Measurement of the Variables

The study's independent, dependent, and controlling variables are measured using different methods.

3.2.1. Measurement of the Dependent Variable

This study's dependent variable is financial distress, which is quantified by the Altman Z-Score, Emerging Market Score, and Interest Coverage Ratio.

The Altman Z-Score is a technique for measuring financial distress that establishes a cutoff point in order to determine whether or not the company in question is experiencing difficulties with its finances. According to the Altman Z-Score, a firm with a score above 2.99 is called "Safe Zone" If a firm's Z-Score is between 1.81 and 2.99 ($1.8 < Z \text{ Score} < 2.99$), it is in the "Grey Zone" and does not have a financial problem but will soon. If a company's Z-Score is less than 1.8, it's in a "Distress Zone" and may soon file for bankruptcy (Altman, 1968).

The Emerging Market Score Model improves emerging market financial crisis forecasting (Khurshid et al., 2020). According to the Emerging Market Score, if a particular firm scores above 2.6 are classified as a firm with no chance of financial distress and is considered a

"Safe Zone." When the value of the Emerging Market Score of a particular firm lies between 1.1 and 2.6 ($1.1 < \text{Emerging Market Score} < 2.6$), that firm is categorized as a "Grey Zone," and it suggests that the company does not have a financial crisis at present but will face financial difficulties shortly. Similarly, if a particular business firm's Emerging Market Score has a value below 1.1, it indicates that the company is likely heading for bankruptcy soon and is treated as a "Distress Zone" (Khurshid et al., 2020).

The Interest Coverage Ratio (ICR) is an indicator to measure the financial distress of a particular business firm (Choe & Her, 1999). ICR is the ratio of Earnings Before Interest and Taxes (EBIT) to its interest expenses. Previous research indicates that the ICR level can be a significant indicator of financial distress that provides useful information for policy considerations. (Choe & Her, 1999). According to Agustini and Wirawati (2018), if the ICR is below two, the company is burdened by debt expense and would soon confront a position of financial distress. If the firm's ICR value is above two, the firm has no burden by debt expenses, enabling the firm to operate its activities without having any financial problems in the future.

3.2.2. Measurement of the Independent Variable

The Herfindahl-Hirschman Index measures ownership diversity for this study. The Blau's Index and the HHI are commonly used measures to determine the level of diversity within an industry (Schultz et al., 2010; Gaur et al., 2015; Manzanque et al., 2016; Donker et al., 2009). The HHI is used when different categories used to calculate the diversity index do not share in the various categories (Williams & O'Reilly, 1998). This study does not share one ownership category with another ownership category. Therefore, the most suitable diversity index for the study is the HHI. The formula to determine the HHI is as follows.

$$\text{HHI} = 1 - \sum_{i=0}^k s_i^2$$

According to the above formula, s_i^2 denotes the ownership category while i and k denote the number of ownership categories in the research study. The value of the HHI varies from zero (0) to one (1). Higher HHI values indicate a diversified ownership structure. In comparison, the lower values of the HHI closer to zero indicate that ownership is not diversified (concentrated ownership). The study takes only the block-holding ownership percentage (significant shareholders) to calculate the HHI for this study. A shareholder who owns more than 10% of the company's ordinary share capital is called a block-holder, and those have controlling power over that company (Shleifer & Vishny, 1986). These shareholders are

significant for decision-making in the company. The study ignores the shareholders who owned less than 10% of a particular firm's ownership as they are of insignificance for this study.

The study employed domestic individual ownership, government ownership, foreign individual and institutional ownership, domestic institutional ownership and other ownership structures to produce HHI's ownership diversity index (Woidtke, 2002; Duggal & Millar, 1999; Cornett et al., 2003; Elyasiani & Jia, 2010; Charfeddine & Elmarzougui, 2010).

3.2.3. Measurement of Controlling Variables

The study used five controlling variables to indicate the combined effect of ownership diversity on financial distress. Following Ting and Lean (2011), firm size, leverage, net profit margin, sales growth, and payout ratio were used as controlled variables.

3.3. Econometric Models Specification

Three logistic regression models were used to estimate the impact of ownership diversity on listed companies in Sri Lanka.

$$FD_{it} = \beta_0 + \beta_1 OD_{it} + \beta_2 FS_{it} + \beta_3 PM_{it} + \beta_4 PR + \beta_5 LV_{it} + \beta_6 SG_{it} + \beta_{7-13} YD_{it} + \varepsilon_{it}$$

Where,

- FD_{it} = Financial distress prediction models (Altman Z-Score, Emerging Market Score, and Interest Coverage Ratio).
- OD_{it} = Ownership Diversity
- FS_{it} = Firm Size
- PM_{it} = Net Profit Margin
- PR_{it} = Payout Ratio
- LV_{it} = Leverage
- SG_{it} = Sales Growth
- $\beta_{7-13} YD$ = Year Dummies
- ε_{it} = Error Term

The study used the three logistic regression models to examine the impact of ownership diversity on financial distress. When the dependent variable is a dummy, logistic regression

overcomes OLS parameters (Udin et al., 2017). According to model 01, the study categorised sampled organizations as financially healthy or distressed based on the Altman Z score following Malik et al. (2019). Firms are deemed financially healthy if their Z score is more than 1.81, and in financial distress if it falls below 1.81. Based on this, the study calculated a dummy variable ($AZSFD_{it}$) as the dependent variable that took the value "1" if the firms are in financial distress and "0" otherwise.

The emerging Market Score is used to quantify financial distress in Model 2 of the research study (EMS). On the basis of EMS, the research classed the chosen firms as financially healthy or distressed. If EMS is over 1.1, firms are considered financially sound; if EMS is below 1.1, firms are considered in financial distress. Depending on this information, the research developed a dummy variable ($EMS\ FD_{it}$) that takes the value "1" if the firms are experiencing financial distress and "0" otherwise.

The third econometric model (Model 3) evaluated the impact of ownership diversity on financial distress following Agustini and Wirawati (2018). In this paradigm, ICR measures financial distress. Based on Interest Coverage Ratio, the research characterized organizations as financially healthy or distressed. The above two, firms are considered financially sound. Below two, firms are considered financially distressed. Based on this, the research produced a dummy dependent variable ($ICR\ FD_{it}$) that is "1" if businesses are in financial distress and "0" otherwise.

The explanatory variable of this model is ownership diversity (OD_{it}), measured using the Herfindahl-Hirschman Index. The controlling variables of the model are FS, PM, PR, LV and SG. The $\beta_{7-13}YD$ are the year dummies used by the study to investigate any significant year's impact on the research study's econometric model. The ϵ_{it} is the composite error term of the model.

In logistic regression models, dependent and independent variables need not be linear. (Hoffman et al., 2007). The separate variables do not need to be regular multivariate in logistic regression models, but multivariate normality offers a more robust solution (Borucka & Grzelak, 2019). The error term of the logistic regression model does not need to be multivariate normally distributed (Gregor et al., 2018). For each stage of the independent variables, the logistic regression does not need variance since it does not need homoscedasticity (Gregor et al., 2018).

3.4. Marginal Probability Analysis

The study used a marginal probability analysis to determine the chance of change in probability (ΔP) associated with CSE-listed companies' financial distress due to changes in explanatory and confounding variables. Only logistic regression models can calculate marginal probabilities because they convert the estimated function into logistic probability using the logistic distribution function. Following Gujarati (2003), Perera (2014), and Udin et al. (2017), the study estimated the marginal probability (ΔP) of each explanatory and controlling variable in the research study.

3.5. Robustness Test

The study performed additional analyses to assess the robustness of the results. The study developed all the main regression models using dummy variables. In addition, the study transformed the dummy factors into continuous variables as the dependent variable to examine how ownership diversity affects financial distress. as performed by Manzanque et al. (2016). The study uses a three-panel regression analysis to demonstrate ownership diversity's causal influence on CSE-listed businesses' financial distress.

4. Results

In this section, the empirical findings are presented after data was collected from listed companies on the CSE.

4.1. Summary Statistics

Table 1 summarizes the variables used to analyze the association between ownership diversity and financial distress for 186 CSE-listed enterprises from 2012 to 2019.

Table 1 Summary Statistics of Variables

<i>Variable</i>	<i>Observation</i>	<i>Mean</i>	<i>Median</i>	<i>SD</i>	<i>Kurtosis</i>	<i>Skewness</i>	<i>Minimum</i>	<i>Maximum</i>
<i>s</i>	<i>s</i>	<i>n</i>	<i>n</i>		<i>s</i>	<i>s</i>		
<i>Dependent Variable (Financial Distress)</i>								
<i>AZS</i>	1488	0.192	0	0.394	3.440	1.562	0	1
<i>EMS</i>	1488	0.053	0	0.224	16.891	3.986	0	1
<i>ICR</i>	1488	0.525	1	0.499	1.010	0.102	0	1
<i>Independent Variable (Ownership Diversity)</i>								

OD	1488	0.127	0	0.190	2.239	0.982	0	0.624
Controlling Variables								
FS	1488	6.443	6.499	0.649	4.072	0.475	3.814	8.229
PM	1488	0.722	0.081	10.56	506.506	15.263	-158.8	303.489
				7				
PR	1488	3.664	0.500	9.680	33.596	5.082	0.0007	95.770
LV	1488	0.336	0.341	0.223	2.500	0.493	0.0002	0.9993
SG	1488	0.384	0.054	3.980	288.374	15.648	-14.45	92.000

Note: Table acronyms are described as follows: AZS = Altman Z-Score Analysis, EMS= Emerging Market Score, ICR= Interest Coverage Ratio, OD=Ownership Diversity, FS=Firm Size, PM=Net Profit Margin, PR=Payout Ratio, LV=Leverage, SG= Sales Growth.

The results of the research study's summary statistics reveal that only a few listed companies of the CSE are having a risk of experiencing a financial distress situation. According to the Altman Z Score analysis, there were only 19.22% of the sampled companies are having a possibility of financial distress. This result is 5.3% when the possibility of having financial distress is calculated based on the Emerging Market Score. When the interest coverage ratio is used, the results reveal that 52.25% of the CSE companies are having the possibility of financial distress in the future. The maximum value and the minimum value of the research study's dependent variables revealed that CSE-listed companies include both financially distressed firms and healthy financial firms. The mean value (12.71%) of the explanatory variable of the research study revealed that most Sri Lankan listed companies have less diversified ownership structures. This finding indicates that the majority of Sri Lankan listed firms have a concentrated ownership structure. This conclusion is congruent with those of Samarakoon (1999) and Manawaduge and Zoysa (2013).

4.2. Correlation Analysis

The study undertakes three correlation analyses to investigate the association among each variable in the research study. The study's continuous variables were correlated using Pearson analysis. In order to analyze the nature of the connection that exists between the study's continuous and dummy variables, a polychoric correlation analysis was carried out. The study also used Tetrachoric correlation analysis to evaluate the relationship among the dummy variables. Table 2 below shows all the results of the three correlation analyses.

Table 2 Correlation Matrix

<i>Variable</i>	<i>AZS</i>	<i>EMS</i>	<i>ICR</i>	<i>OD</i>	<i>FS</i>	<i>PM</i>	<i>PR</i>	<i>LV</i>	<i>SG</i>
<i>AZS</i>	1.0000	-	-	-	-	-	-	-	-
<i>EMS</i>	1.00***	1.0000	-	-	-	-	-	-	-
<i>ICR</i>	0.37***	0.18***	1.0000	-	-	-	-	-	-
<i>OD</i>	0.07***	0.16***	0.06**	1.0000	-	-	-	-	-
<i>FS</i>	0.0391	-0.07***	0.0051	0.06**	1.0000	-	-	-	-
<i>PM</i>	-0.2***	-0.0242	-0.0098	-0.001	0.052**	1.000	-	-	-
<i>PR</i>	-0.4***	-0.25***	0.043*	0.0322	0.10***	0.012	1.0000	-	-
<i>LV</i>	0.37***	0.088***	0.1***	0.0***	0.07***	-0.03	0.09***	1.000	-
<i>SG</i>	-0.0***	-0.05018*	.051**	-0.007	-0.0***	-0.01	-0.0117	-0.03	1.000

Note: *** Significance at the 1% level (two-tailed); ** Significance at the 5% level (two-tailed); * Significance at the 10% level (two-tailed)

Pearson Correlation Analysis was utilized to analyze the study's continuous variables (OD, FS, PM, PR, LV, and SG). The ownership diversity is positively and significantly ($P < 0.05$) related to the firm's size and leverage ($P < 0.01$), as shown in Table 2. On the other hand, the net profit margin ($P < 0.05$), payout ratio ($P < 0.01$) and leverage ($P < 0.01$) are positively and significantly associated with the firm size. The firm size negatively ($P < 0.01$) affects sales growth. In addition, the leverage of the company has a positive and statistically significant relationship with the payout ratio. ($P < 0.01$). These findings are consistent with the findings of a study conducted by Ting and Lean (2011) and Udin et al (2017).

The study used polychoric correlation analysis to compare the association with continuous and dummy variables. Table 2 shows that ownership diversity is positively correlated with all financial distress indicators. These findings show that the CSE's non-diversified ownership structure supervises company management to ensure improved performance and financial stability. These findings are similar to the findings of Elston and Yang (2010) and Hu and Zheng (2015).

The study used tetrachoric correlation analysis to investigate the association among dummy variables used in the research study. Table 2 shows a positive and significant relationship

between Altman Z Score and the Emerging Market Score. (P=0). These results imply that similar financial distress prediction results arise from Altman Z Score Analysis and the Emerging Market Score Analysis for the Sri Lankan Context. The tetrachoric correlation analysis shows that all of the binary variables used to measure financial distress are positively correlated.

4.3. Logistics Regression Results

The logistic regression findings are shown in Table 3 Using standard error, all logistic regression models are corrected for heteroscedasticity, autocorrelation (VCE), and cross-sectional dependency.

Table 3 Logistic Regression Models

<i>Variables</i>	<i>Model 01</i> (Financial Distress is Measured using the Altman Z Score)	<i>Model 02</i> (Financial Distress is Measured using the Emerging Market Score)	<i>Model 03</i> (Financial Distress is Measured using the Interest Coverage Ratio)
<i>Independent Variable (Ownership Diversity – Measured Using the HHI)</i>			
<i>OD_{it}</i>	0.3176 (0.9232)	2.0719** (1.0666)	0.5154** (0.8724)
<i>Controlling Variables</i>			
<i>FS_{it}</i>	-0.1424 (0.3825)	-0.7734* (0.4371)	0.2685 (0.3663)
<i>PM_{it}</i>	-0.0674** (0.0334)	-0.0116 (0.0225)	-0.0085 (0.0076)
<i>PR_{it}</i>	-0.0671** (0.0299)	-0.0265 (0.0354)	-0.0148 (0.0162)
<i>LV_{it}</i>	5.1423*** (0.7214)	1.4552* (0.8452)	2.1977*** (0.6086)
<i>SG_{it}</i>	-0.0418 (0.0345)	-0.01789 (0.0434)	0.0135 (0.0191)
<i>Year Dummies</i>			
<i>2013</i>	-0.4197 (0.4380)	-0.0998 (0.6332)	0.6768** (0.3163)
<i>2014</i>	0.3921 (0.4130)	0.7496 (0.5709)	0.7207** (0.3199)
<i>2015</i>	0.2927 (0.4167)	0.2846 (0.5966)	0.0147 (0.3195)
<i>2016</i>	0.7478* (0.4135)	0.2896 (0.5999)	-0.0927 (0.3212)
<i>2017</i>	0.6323 (0.4204)	0.4372 (0.5922)	0.5391* (0.3240)
<i>2018</i>	1.0378** (0.4164)	0.5076 (0.5937)	0.6207* (0.3279)
<i>2019</i>	1.8180*** (0.4176)	0.9694* (0.5672)	0.9908*** (0.3341)
<i>Constant</i>	-4.4137 (2.4278)	-1.0316 (2.6512)	-2.6126 (2.3329)
<i>McFadden R²</i>	0.2928	0.2712	0.3343

LR Statistic	101.46	28.96	39.67
Prob (LR Statistic)	0.0000	0.0054	0.0002
SE Adjusted	Yes	Yes	Yes
Groups	186	186	186
Observations	1,488	1,488	1,488

*Note: *** significance at the 1% level; ** Significance at the 5% level; * Significance at the 10% level; Standard Errors are presented below the coefficient in parenthesis.*

According to the logistic regression results of model 01 of the study, the ownership diversity is not statistically significant for financial distress. These findings are similar to the research findings investigated by Begley et al. (1996). According to Begley et al. (1996), the Altman Z Score analysis results are more accurate in predicting the financial distress of companies in developed countries than the emerging countries. Further, Nanayakkara and Azeez (2015) revealed that, due to the low financial distress prediction model of the Altman Z Score analysis in relation to the Sri Lankan economy, there is an urgent requirement of developing the most prominent Altman Z Score model suitable for the emerging economies like Sri Lanka. According to this model, the net profit margin and the payout ratio negatively and significantly impact the listed companies' financial distress the CSE at the 5% significant level. The leverage positively and significantly impacts financial distress at the 1% significant level. These findings are consistent with Udin et al. (2017). Further, the results indicate that only 2016, 2018, and 2019 year dummies have a significant and positive impact on financial distress at 10%, 5%, and 1% significant levels, respectively.

According to the logistic regression results of model 02 of the study, the ownership diversity coefficient is positively and statistically significant for financial distress. These results are consistent with the empirical evidence of Khurshid et al. (2020). Logic model 2 of the study indicated that firm size negatively affects CSE-listed companies' financial distress at the 10% significant level. This finding is supported by Udin et al. (2017). The leverage positively and significantly impacts financial distress at the 1% significant level. These results are in line with the findings of Jiang et al. (2010). According to this model, except for 2019 (significant at 10%), all the other year dummies are not statistically significant for predicting financial distress in CSE-listed companies.

According to model 03's logistic regression results, ownership diversity is statistically significant for financial distress. These findings are supported by Youn and Gu (2010). This finding suggests that, with the increase of ownership diversity of a firm, its likelihood of financial distress will also increase. This finding is supported by Agustini and Wirawati (2018). Further, this model discovered that only financial leverage positively and substantially affects financial distress at the 1% significant level. This finding is consistent with the study carried out by Jiang et al. (2010) & Udin et al. (2017). According to this model, 2013, 2014, 2017, 2018, and 2019 year dummies have a significant and positive impact on financial distress at 5%, 5%, 10%, 10%, and 1% significant levels, respectively.

4.4. Marginal Probability Analysis

Following Gujarati (2003); Perera (2014) and Udin et al. (2017), a marginal probability analysis was undertaken to determine the possibility of a change in financial distress probability of CSE-listed companies due to changes in explanatory and controlling variables. This was done so that the study could identify the likelihood of change in probability.

Table 4.4 Marginal Probability Analysis

<i>Variables</i>	<i>Model 01</i> <i>(Altman Z Score)</i>	<i>Model 02</i> <i>(Emerging Market Score)</i>	<i>Model 03</i> <i>(Interest Coverage Ratio)</i>
<i>Independent Variable (Ownership Diversity)</i>			
<i>OD_{it}</i>	0.09095	0.090956**	0.11050**
<i>Controlling Variables</i>			
<i>FS_{it}</i>	-0.01264	-0.01264*	-0.00806
<i>PM_{it}</i>	-0.00007***	-0.00007	-0.00020
<i>PR_{it}</i>	-0.00362**	-0.00362	-0.00123
<i>LV_{it}</i>	0.03116***	0.031166*	0.240080***
<i>SG_{it}</i>	-0.00190	-0.00190	-0.00559
<i>Groups</i>	186	186	186
<i>Observations</i>	1,488	1,488	1,488

Note: *** significance at the 1% level; ** Significance at the 5% level; * Significance at the 10% level.

According to the results of marginal probability analysis, the ownership diversity is positively and statistically significant financial distress at a 5% significance level in model 02 and model 03. The financial distress of the listed companies on the CSE, as evaluated by the Altman Z Score, is positive; however, this effect is not statistically significant. The marginal probability analysis results revealed that financial leverage is positively and statistically significant for all three logistic regression models of the research study.

Model 02's positive sign for ownership diversity showed that if the OD goes up by one unit, the chance of financial distress drives up by 0.090956 percent. Model 03's positive sign for ownership diversity showed that if the OD goes up by one unit, the chance of being in financial distress goes up by 0.11050.

4.5. Results of Robustness Test

To test the robustness of the results, some further analysis has been carried out by the study, followed by Udin et al. (2017). All primary regression models included dummy variables. As a subsequent analysis, the study converted the dummy variables to continuous variables as the dependent variable of the study. Under the robustness test, the study performed three (03) panel regression analyses to establish the ownership diversity's causal effect on the listed companies' financial distress of the CSE.

The robustness results demonstrated similar outcomes to those obtained from the study's primary regression models. The panel regression analysis of the research study found that using continuous variables to assess financial distress is statistically significant for investigating the impact of listed companies' financial distress on the CSE. According to the research study's panel regression results, the ownership diversity coefficient favorably affects the financial distress of CSE-listed companies as indicated by the Emerging Market Score and Interest Coverage Ratio.

5. Conclusion

The major conclusions and summary of the research study are presented in this part.

According to the summary statistics, most Sri Lankan listed companies have a concentrated ownership structure. This result is in line with Manawaduge and Zoysa (2013) and Samarakoon (1999). The study found a positive and significant association between ownership diversity and CSE-listed companies' financial distress using correlation analysis. These findings suggest that CSE-listed businesses with non-diversified ownership oversee

management to improve company performance and minimize financial distress. These results align with the research conducted by Elston and Yang (2010) and Hu and Zheng (2015).

The research study's logistic regression analysis found that the ownership diversity coefficient positively affects financial distress, as evaluated by the Emerging Market Score and Interest Coverage Ratio of CSE-listed companies. Shleifer and Vishny (1986), Claessens et al. (2002), Elloumi and Gueyie (2001), and Parker et al. (2002) all support this conclusion. This is a result of the non-diversified shareholder efficiently monitoring the firms' operations to reduce the financial distress scenario without generating information asymmetry to achieve personal benefits and without ignoring the interests of the smaller shareholders (Elloumi and Gueyie, 2001). The study's logistic regression models found that PM (Model 1), PR (Model 1), and FS (Model 2) negatively impact CSE-listed companies' financial distress. On the other hand, LV positively and statistically impacts the financial distress of CSE-listed companies in all three models of the study.

Marginal probability analysis revealed that there is a relatively small percentage of probability for the occurrence of financial distress due to diversifying ownership in the CSE-listed companies.

The robustness test showed similar results to the main regression models. The results demonstrated that using continuous variables to evaluate financial distress is statistically significant for determining the effect of ownership diversity on financial distress.

The study reveals that ownership diversity positively affects financial distress as evaluated by the Emerging Market Score and Interest Coverage Ratio, but not as measured by the Altman Z Score of CSE-listed companies. The primary reason for these positive relationships may be because the non-diversified (concentrated) shareholders carefully oversee enterprises' operations to prevent financial distress without generating information asymmetry for personal gain and not ignoring minor shareholders' interests (Elloumi and Gueyie, 2001). This will aid in the formation of a favorable relationship between the company's agents and principals, and both parties will work together to maximize the shareholders' wealth. However, when the owner is diversified, it raises the agency cost since it incurs significant monitoring costs to monitor diverse shareholders, resulting in financial distress for the business firm.

In a number of ways, this study contributes to the understanding of corporate governance. Using a widely accepted diversity index (HHI), this research shows for the first time in the context of Sri Lanka how ownership diversity affects the financial distress of CSE-listed firms. Researchers in the area of finance who are interested in finding the impact of corporate governance on financial distress will find the results and the different approaches used in this study very useful.

This study's sample was confined to firms listed on the CSE. However, corporate governance structures vary from country to country. Furthermore, different stock markets throughout the world have varied reporting standards as well as distinct economic and fiscal situations which may have an influence on the financial distress of enterprises operating in those nations. It would be crucial for future researchers to replicate this work by utilizing data from different stock exchanges and nations to discover whether they could acquire comparable proof.

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